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EFFECT OF SALINITY ON SEED GERMINATION AND SEEDLING GROWTH OF HIGH YIELDING BRINJAL CULTIVARS

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Abstract: An experiment was conducted at the laboratory of the Department of Seed Science and Technology, Bangladesh Agricultural University, Mymensingh during the month of November 2019 to find out the effect of different levels of salinity on seed germination of nine cultivars of brinjal, namely BARI Begun-1, BARI Begun-4, BARI Begun-5, BARI Begun-6, BARI Begun-10 and Bt Begun-1, Bt Begun-2, Bt Begun-3 and Bt Begun-4. The brinjal seeds of the said cultivars were treated with four salinity levels viz.0 (control), 50, 100, 150 mM NaCl. The two-factor experiment was laid out following completely randomized design (CRD) with three replications. Levels of salinity had significant effect on seed germination. Rates of seed germination, root and shoot length, root and shoot fresh weight, primary leaf-containing seedlings per petri dish and seedling vigor were reduced with increasing level of salinity as compared to control and 50 mM NaCl. The seed of cultivar Bt Begun-3 germinated first at 4 days after sowing (DAS) in control, 50, 100 and 150 mM NaCl. The cultivar BARI-5 seed first germinated at 6 DAS in all salinity levels. At 12 DAS, higher germination (100%) was recorded at control in Bt Begun-2 and Bt Begun-3 and lower germination (0%) was noticed in Bt Begun-6, Bt Begun-1 at 150 mM NaCl salinity. The reduction of germination was higher in the cultivar Bt Begun-1 than that in the other cultivars. In conclusion, seed germination and seedling growth performance were significantly reduced due to increased salinity. Salinity stress significantly reduced seed germination and seedling growth when salinity levels were more than 50 mM. Among the cultivars tested, the cultivar Bt-3 was found as relatively salt tolerant than those of other cultivars.

Key word: Brinjal varieties, levels of salinity, rate of germination, seedling growth, vigour index.

Introduction

Brinjal (*Solanum melongena* L.) belongs to the family Solanaceae and is generally self-fertilized annual crop. Brinjal is a widely cultivated popular vegetable crop throughout the

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entire tropical and subtropical regions of the world including Bangladesh (Bose and Som, 1986). Brinjal is grown round the year in Bangladesh but the bulk of its production is obtained during the winter season. It is the second most important vegetable crop after potato. Brinjal fruits contain considerable amounts of calorie, iron, and phosphorus and riboflavin than tomato (Shaha, 1989). Brinjal is familiar vegetable crop for its easier cooking quality, better taste and lower market price. The unripe fruit is primarily used as a vegetable for the preparation of various dishes in different regions of the world. It has potentiality as raw material in pickle making and in dehydration industries. Interestingly, it is said that eggplant fruits associate good nutritional value and therapeutic properties (Akinci and Akinci 2004). Salinity represented an important limitation in the progress of modern agriculture (Suraj Kala, 2017). Salinity badly affects the arid or semi-arid land, and whre the precipitation still not enough and the water sources are also unusual due to the needs of water (Al-Taey, 2018). High saline environments cause osmotic stress due to the difficulties in absorbing water from the soil and ion toxicity that can negatively affect the growth of many plants (Al-Taey and Majid, 2018). Salinity has adverse effects on seed germination (Akinci and Akinci 2003; Ibrahim et al. 2003; Hannachi and Van Lebeke 2018) and growth development (Chartzoulakis 1992) of many vegetables. Higher levels of salinity negatively affects levels of seed germination and seedling growth, and the rates of which vary with genotypes and physiological properties of the plants. Hannachi and Van Lebek (2018) reported that increasing NaCl concentration increased strongly the levels of proline, malondialdehyde and soluble carbohydrates in the leaves of 'Adriatica' and 'Black Beauty' eggplant genotypes. In contrast, 'Bonica' and 'Galine' showed a decrease in soluble carbohydrates and a significant increase in starch under the saline stress conditions. The midday leaf water potential and leaf osmotic potential were significantly influenced in the sensitive cultivars and remained quite stable in tolerant cultivars. The leaf Na^+ and Cl^- contents were higher in sensitive than in the tolerant cultivars. The leaf K^+, Ca^{2+} and Mg^{2+} contents were reduced under salt stress in the sensitive cultivars. Under increasing salinity the eggplant genotypes 'Bonica' and 'Galine' combine low leaf Na^+ accumulation with a high plant tolerance index thus maintaining a normal level of growth, while the genotypes 'Adriatica' and 'Black Beauty' accumulate significantly higher concentrations of leaf Na^+ and fail to maintain a normal level of growth from 80 mM NaCl onward. Adequate knowledge and understanding of salt tolerance of vegetables is important for management decisions and therefore, to increase profitability. There are many criteria for determining the levels of salt tolerance of varieties and species. Ideally, they should be simple to measure and permit the identification of salinity tolerance during seed germination or at the seedling stage. There are inadequate reports on salinity and their impacts on seed germination and post-germination plant characteristics in Bangladesh. Therefore, the present piece of work was undertaken with a number of objectives including: to observe the variability of brinjal cultivars under salt stress based on germination, seedling growth and seed quality, and to identify salt tolerant brinjal cultivars from among the tested varieties.

Materials and Methods

This experiment was conducted at Laboratory of the Department of Seed Science and Technology, Bangladesh Agricultural University, Mymensingh, in November 2019.The experiment was conducted to investigate the effects of four levels of salinity on seed germination and subsequent seedling growth of nine varieties of brinjal viz., BARI-1, BARI- 4, BARI-5, BARI-6, BARI-10 and Bt-1, Bt-2, Bt-3, Bt-4. The brinjal seeds were collected from Bangladesh Agricultural Research Institute, Joydebpur, Gazipur. The two-factor experiment was laid out in a completely randomized design (CRD) with three replications. One salinity level represented one treatment and twenty seeds of each variety represented one replication. There were 108 treatment combinations. One hundred and eight clean dry petri dishes (9 cm in diameter and 1.5 cm in height) were used in conducting the experiment. The petri dishes were washed by washing powder followed by ringing with distilled water used for conducting the experiment. After drying the petri dishes were arranged as completely randomized design. The petri dishes also marked for treatments, replications and varieties. Then filter papers Whatman No.1 were placed at the bottom of each petri dish. For making 50 mM salt solution 0.735g NaCl were mixed with 250 ml distilled water in a volumetric flask. Then the flask was shaken for several times for dissolving salt in distilled water. Similarly for making 100 and 150 mM salt solution1.461g and 2.191g NaCl, respectively were mixed with 250 ml distilled water in each volumetric flask. Healthy and disinfected 20 seeds of each variety were placed in each petri dishes. Before placing the seeds, all petri dishes were soaked with ethanol (95%) solution. Then all petri dishes were placed in laboratory where room temperature was 27°C. After four days of sowing, germination (%), shoot length (cm), root length (cm), shoot fresh weight (gm), root fresh weight (gm), number of seedlings having primary leaves and seed vigor index were determined from sample plants.

Results and Discussion

Effect of salinity on seed germination

Germination percentage varied significantly due to the effect of salinity. Seed germination was found statistically similar with that of control and 50 mM NaCl but decreased with increasing salinity levels (100-150 mM NaCl). Seeds of control treatment first germinated followed by 50 mm NaCl. No seeds were found to be germinated at salinity levels of a 100 mM and 150 mM NaCl due to high salt concentration. At 4 DAS, the highest germination (71.15%) was recorded from control, and the lowest germination (2.95%) was obtained from 150 mM NaCl concentration. Salinity level with 50 mM NaCl had relatively higher level of seed germination. Significant variation was also observed among the nine cultivars of brinjal (Fig. 2). At 4 DAS, the highest germination (57.65%) was recorded in Bt Begun-3, where the lowest (9.30%) was observed in BARI Begun-5. The variety Bt Begun-2, however showed relatively higher levels of germination under various levels of salinity (Fig.

2).Similar trend was also found at 6, 7, 8, 9, 10 and 11 DAS. At 12 DAS the highest germination (90.55%) was observed in Bt Begun-3, whereas the lowest germination (31.20%) was recorded from BARI Begun-10 which was lower than those of the other varieties. It might be due to the differences in genetic makeup of the varieties. The results on combined effect of concentration salt solution on seed germination of nine cultivars of brinjal have been presented shown in Table 1.There was significant variation among the treatment combination in respect of seed germination at different days after sowing. At the 4 DAS, the highest germination (89.75%) was recorded in Bt Begun-3 in control. Similar trend was also found in 5, 6, 7, 8, 9, 10, 11 DAS. At 12 DAS, the highest germination (100%) was observed in Bt Begun-3 and also in Bt Begun-2 at control. The lowest germination (0%) was recorded from BARI Begun-6, BARI Begun-10, Bt Begun-1at 150 mM NaCl.

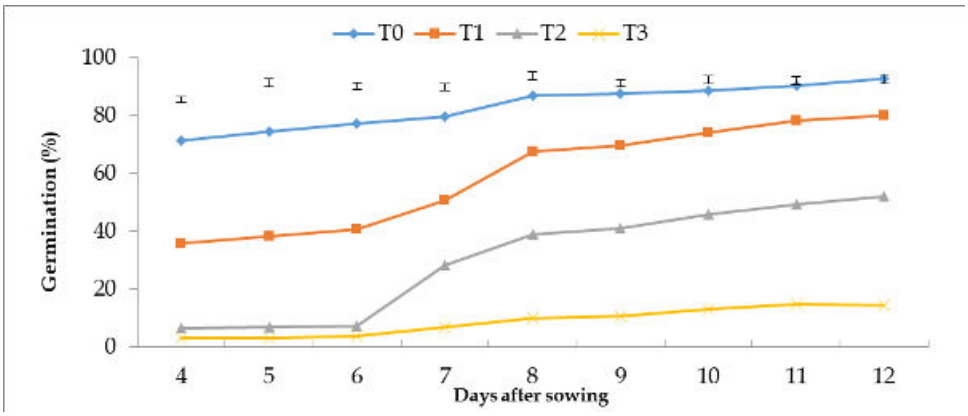

Fig. 1. Main effect of salinity on germination at different days after sowing (T_0 =Control, T_1 =50 mM, T_2=100 mM, T_3 =150 mM; vertical bars represent LSD at 5% level of significance).

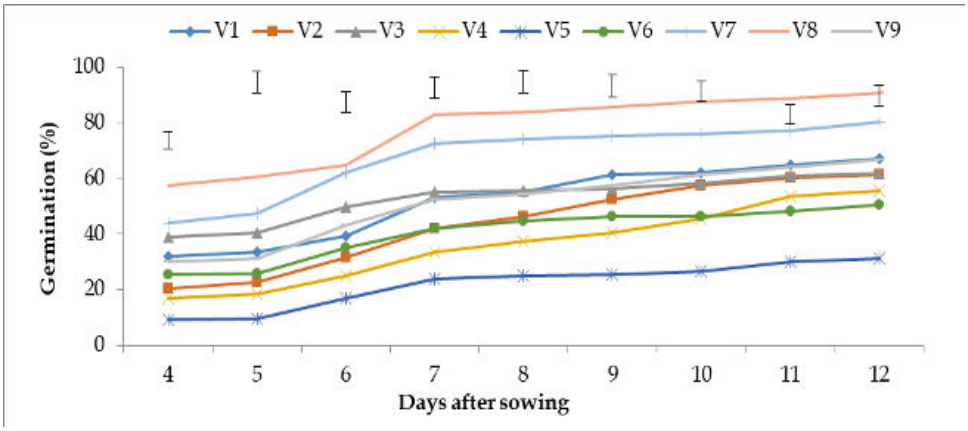

Fig. 2. Main effect of variety on germination at different days after sowing (V_1= BARI-1, V_2 = BARI-4, V_3 = BARI-5, V_4= BARI-6, V_5= BARI-10, V_6= Bt-1, V_7= Bt-2, V_8= Bt-3, V_9= Bt-4; (Vertical bars represent LSD at 5% level of significance).

Table 1. Combined effect of salinity and variety on seed germination at different days after sowing.

Variety	Salinity Levels	Germination (%) at different days after sowing (DAS)								
		4	5	6	7	8	9	10	11	12
BARI Begun -1	T_0	74.35	78.70	80.00	81.60	89.45	93.35	95.00	95.00	95.00
	T_1	45.30	47.65	48.35	63.25	73.10	80.00	85.00	85.00	90.00
	T_2	4.85	5.00	5.00	15.00	27.50	40.00	40.00	48.35	50.00
	T_3	0.00	0.00	0.00	0.00	0.00	0.00	10.00	16.65	16.65
BARI Begun -4	T_0	62.80	68.90	70.00	70.00	79.20	81.65	81.65	85.00	85.00
	T_1	18.65	20.00	20.00	39.55	47.75	63.35	71.50	75.00	83.35
	T_2	0.00	0.00	0.00	0.00	12.50	18.35	33.50	40.00	51.65
	T_3	0.00	0.00	0.00	0.00	5.00	5.00	10.00	10.00	10.00
BARI Begun -5	T_0	85.60	88.90	90.00	93.65	95.00	96.65	96.65	96.65	98.35
	T_1	59.20	60.00	60.00	64.70	67.50	70.00	70.00	71.65	78.35
	T_2	8.05	8.05	8.35	29.35	36.65	43.35	43.35	43.35	43.35
	T_3	0.00	0.00	3.35	5.00	5.00	10.00	10.00	13.35	13.35
BARI Begun -6	T_0	60.60	64.25	66.65	78.00	84.50	90.00	90.00	90.00	95.00
	T_1	5.85	6.65	6.65	20.00	26.75	31.65	0.00	50.00	60.00
	T_2	0.00	0.00	0.00	5.00	10.00	11.65	17.50	21.65	26.65
	T_3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BARI Begun -10	T_0	22.80	25.55	28.35	41.50	48.35	51.65	51.65	58.35	61.65
	T_1	8.15	10.00	10.00	28.00	32.00	35.00	35.00	35.00	36.65
	T_2	0.00	0.00	0.00	0.00	5.00	8.35	8.35	8.35	8.35
	T_3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bt Begun -1	T_0	76.65	80.20	83.35	85.00	85.00	90.00	90.00	90.00	90.00
	T_1	16.20	20.00	20.00	33.50	44.00	56.65	73.35	73.35	73.35
	T_2	0.00	0.00	0.00	12.50	20.00	21.65	21.65	21.65	21.65
	T_3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bt Begun -2	T_0	94.25	95.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	T_1	62.60	65.65	68.35	83.95	89.20	98.35	98.35	98.35	98.35
	T_2	19.75	20.55	21.65	39.40	68.80	76.65	76.65	86.65	88.35
	T_3	0.00	0.00	0.00	5.00	5.00	15.00	15.00	16.65	16.65
Bt Begun -3	T_0	89.75	91.95	93.35	93.35	93.35	93.35	96.65	96.65	100.00
	T_1	82.25	84.90	88.35	88.35	95.00	95.00	95.00	95.00	98.35
	T_2	22.50	26.10	30.00	50.55	70.60	83.35	83.35	86.65	88.65
	T_3	15.00	27.50	30.00	47.50	56.00	60.00	60.00	65.00	65.00
Bt Begun -4	T_0	77.40	79.70	81.65	81.65	85.00	85.00	86.65	86.65	88.35
	T_1	39.40	40.85	43.35	61.05	73.70	76.65	83.35	83.35	85.00
	T_2	0.00	0.00	0.00	10.00	22.50	48.35	48.35	55.00	66.65
	T_3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	5.00
LSD at 5%		2.11	2.84	2.63	2.72	3.03	3.15	3.21	2.97	2.66
LSD at 1%		3.03	4.08	3.81	3.91	4.36	4.54	4.62	4.30	3.83
Level of significance		**	**	**	**	**	**	**	**	**

T_0 = Control, T_1 =50 mM, T_2 =100 mM, T_3 =150 mM; ** indicates significant at 0.01 probability, * indicates significant at 0.05 probability

Effect of salinity on shoot length

Significant effect was found for seed germination was observed in influencing shoot length due to various levels of salinity (Fig. 3). At 6 DAS, the highest shoot length (1.29 cm) was observed in control and the lowest (0.06 cm) was recorded in 150 mM NaCl. Trend of shoot length observed at 8 and 10 DAS, accordingly. At 12 DAS, the highest shoot length (3.48 cm) was observed in control and lowest (0.14 cm) was in 150 mM salinity level. Overall, lower concentration of 50 mM NaCl had also showed relatively longer shoot among the various levels of salinity. Significant variation was also found due to variety to influence shoot length. At 6 DAS, the highest shoot length (1.18 cm) was found in Bt Begun-3 followed by BARI Begun-5, and the lowest (0.20 cm) was found in BARI Begun-6. Similar trend of shoot length was observed at 8 and 10 DAS. At 12 DAS, the maximum shoot length (3.08 cm) was found in Bt Begun-3 and the lowest (0.88 cm) was found in BARI Begun-4. The combined effect of salinity stress to varieties on the shoot length was significant during the seedling stage and summarized in Table 2.

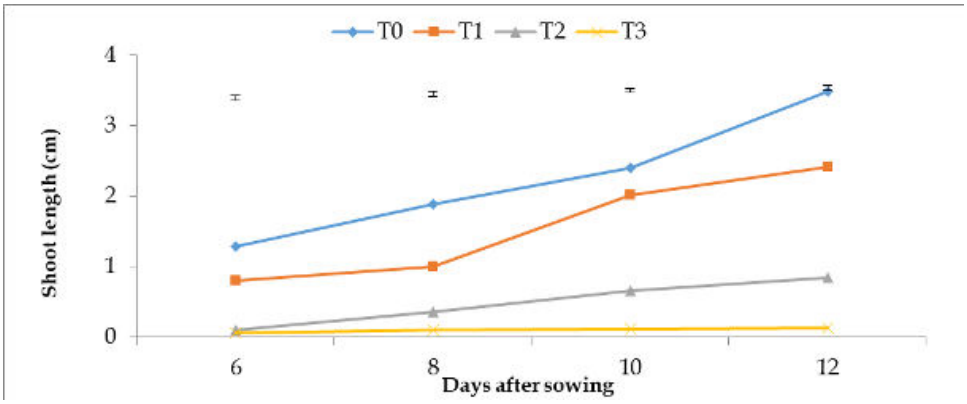

Fig. 3. Effect of salinity on shoot length at different days after sowing (T_0 =Control, T_1 =50 mM, T_2=100 mM, T_3 =150 mM; Vertical bars represent LSD at 5% level of significance).

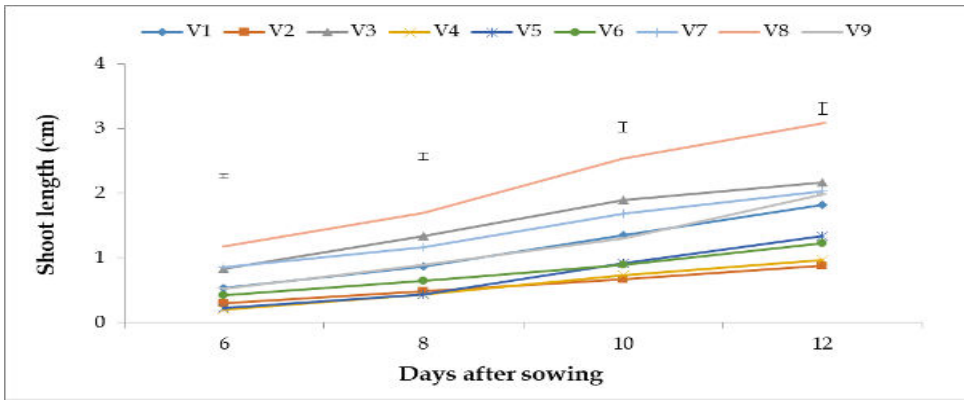

Fig. 4. Main effect of variety on shoot length at different days after sowing (V_1 =BARI-1, V_2 =BARI-4, V_3 =BARI-5, V_4 =BARI-6, V_5 =BARI-10, V_6 =Bt-1, V_7=Bt-2, V_8 =Bt-3, V_9 =Bt-4; vertical bars represent LSD at 5% level of significance).

Table 2: Combined effect of salinity and variety on shoot length at different days after sowing.

Variety	Salinity Level	Shoot Length (cm) at different days after sowing (DAS)			
		6	8	10	12
BARI Begun -1	T_0	0.97	1.86	2.46	3.43
	T_1	0.93	1.33	2.12	2.98
	T_2	0.22	0.31	0.48	0.67
	T_3	0.00	0.00	0.00	0.20
BARI Begun -4	T_0	0.83	1.18	1.37	1.79
	T_1	0.35	0.56	0.82	1.04
	T_2	0.00	0.18	0.30	0.47
	T_3	0.00	0.15	0.18	0.20
BARI Begun -5	T_0	1.40	2.73	3.80	4.22
	T_1	1.17	1.90	2.59	3.78
	T_2	0.00	0.34	0.37	0.39
	T_3	0.17	0.19	0.22	0.25
BARI Begun -6	T_0	0.62	1.23	2.21	3.07
	T_1	0.20	0.32	0.40	0.49
	T_2	0.00	0.18	0.26	0.33
	T_3	0.00	0.00	0.00	0.00
BARI Begun -10	T_0	0.63	1.07	2.59	3.16
	T_1	0.30	0.43	1.19	1.69
	T_2	0.00	0.20	0.26	0.32
	T_3	0.00	0.00	0.00	0.00
Bt Begun -1	T_0	1.33	1.87	2.30	2.79
	T_1	0.37	0.56	1.21	1.94
	T_2	0.00	0.20	0.20	0.20
	T_3	0.00	0.00	0.00	0.00
Bt Begun -2	T_0	1.88	2.34	3.11	3.59
	T_1	1.23	1.76	2.22	2.99
	T_2	0.28	0.44	0.99	1.31
	T_3	0.00	0.15	0.20	0.24
Bt Begun -3	T_0	2.47	3.51	4.30	5.04
	T_1	1.43	1.96	2.76	3.89
	T_2	0.40	0.98	2.56	3.01
	T_3	0.27	0.33	0.36	0.38
Bt Begun -4	T_0	1.45	2.99	3.57	4.22
	T_1	0.65	1.20	2.00	2.80
	T_2	0.00	0.37	0.58	0.89
	T_3	0.00	0.00	0.00	0.00
LSD at 5%		0.32	0.88	1.00	0.86
LSD at 1%		0.46	1.26	0.90	1.23
Level of significance		**	**	**	**

T_0 =Control, T_1 =50 mM, T_2=100 mM, T_3 =150 mM; ** indicates significant at 0.01 probability.

Effect of salinity on root length

The results related to root length have been shown in Fig. 5. Considering the salinity levels, at 6 DAS, the highest root length (1.29 cm) was observed in control and the lowest (0.06 cm) was recorded in 150 mM salinity level. Similar trend of root length observed at 8 and 10 DAS. At 12 DAS, the highest root length (3.48 cm) was observed in control and lowest (0.14 cm) was in 150 mM salinity level. Among the genotypic means, the results related to root length have been shown in Fig. 6. At 6 DAS, the highest root length (1.18 cm) was found in Bt Begun-3 and the lowest (0.20 cm) was found in BARI Begun-6. Similar trend of root length was observed at 8 and 10 DAS. At 12 DAS, the maximum root length (3.08 cm) was found in Bt Begun-3 and the lowest (0.88 cm) was found in BARI Begun-4. The combined effect of salinity stress and varieties on the root length was significant during the seedling stage (Table 3).

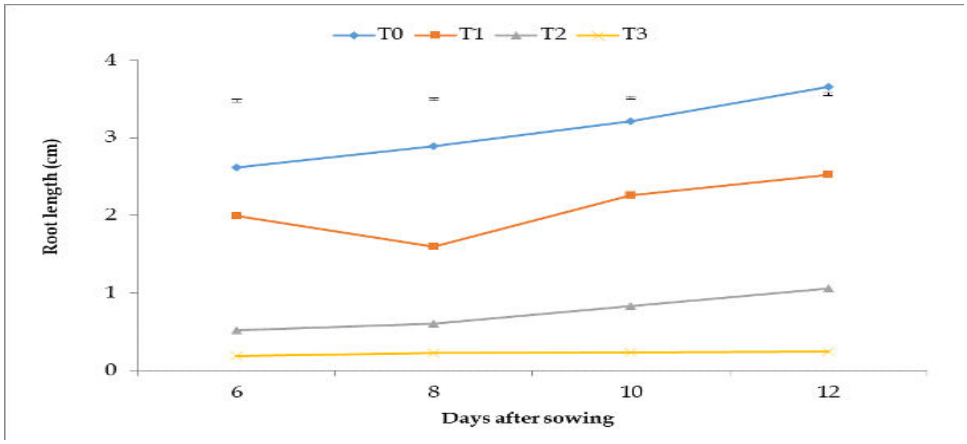

Fig. 5. Main effect of salinity on root length at different days after sowing (T_0 =Control, T_1 =50 mM, T_2=100 mM, T_3 =150 mM; vertical bars represent LSD at 5% level of significance).

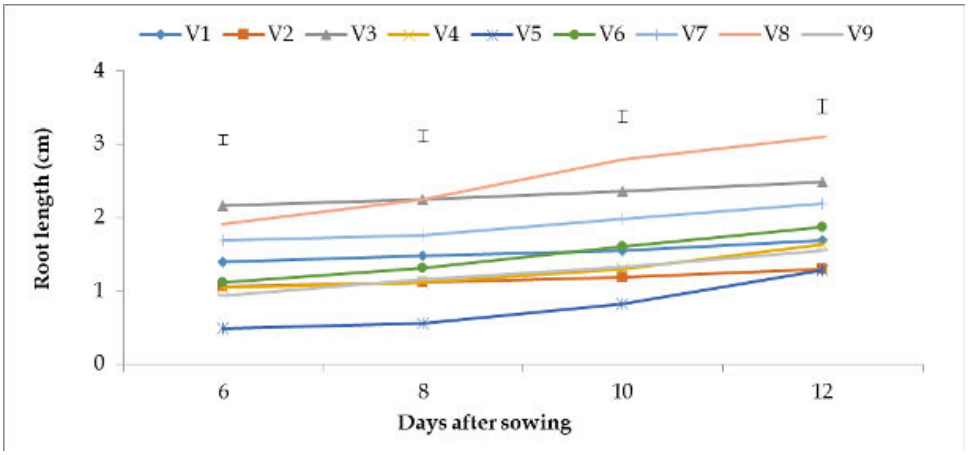

Fig. 6. Main effect of variety on root length at different days after sowing (V_1 =BARI-1, V_2 =BARI-4, V_3 =BARI-5, V_4 =BARI-6, V_5 =BARI-10, V_6 =Bt-1, V_7=Bt-2, V_8 =Bt-3, V_9 =Bt-4; vertical bars represent LSD at 5% level of significance).

Effect of salinity on number of seedlings having primary leaves at 12 days after sowing

Significant difference was observed in relation to number of primary leaves as influenced by salinity levels (Table 4). At 12 DAS, the highest primary leaves containing seedlings (14.15) was observed in control followed by 50 mM NaCl (9.15), while the lowest (0.00) was recorded with high concentration of 150 mM salinity. Varieties also caused significant variation in number of seedlings having primary leaves (Table 4). At 12 DAS, the highest number of seedlings having primary leaves (12.00) was recorded in Bt Begun-3 followed by Bt Begun-2 (10.58), and lowest (3.17) was found in BARI Begun-10. The combined effect of salinity stress to varieties on number of seedlings having primary leaves at 12 days after sowing was also significant (Table 6). From the result it is evident that salinity levels influenced the number of seedlings having primary leaves in nine varieties of brinjal.

Table 3. Combined effect of salinity and variety on root length at different days after sowing.

Variety	Salinity Level	Root length (cm) at different days after sowing(DAS)			
		6	8	10	12
BARI Begun -1	T_0	2.85	3.50	3.60	3.78
	T_1	1.08	1.63	1.78	1.92
	T_2	0.50	0.55	0.84	1.08
	T_3	0.10	0.30	0.37	0.43
BARI Begun -4	T_0	2.01	2.31	2.49	2.76
	T_1	1.20	1.29	1.42	1.67
	T_2	0.23	0.28	0.37	0.48
	T_3	0.18	0.24	0.31	0.45
BARI Begun -5	T_0	3.37	3.66	4.14	4.87
	T_1	2.68	3.36	3.91	4.22
	T_2	0.40	0.43	0.45	0.47
	T_3	0.15	0.25	0.31	0.37
BARI Begun -6	T_0	3.03	3.17	3.33	3.51
	T_1	1.07	1.70	2.14	2.51
	T_2	0.18	0.34	0.42	0.51
	T_3	0.00	0.00	0.00	0.00
BARI Begun -10	T_0	1.19	1.78	2.23	2.87
	T_1	0.55	0.70	1.20	1.87
	T_2	0.13	0.33	0.36	0.39
	T_3	0.00	0.00	0.00	0.00
Bt Begun -1	T_0	2.98	3.68	4.11	4.53
	T_1	1.20	1.46	1.98	2.50
	T_2	0.18	0.18	0.29	0.43
	T_3	0.00	0.00	0.00	0.00
Bt Begun -2	T_0	3.02	3.28	3.57	3.90
	T_1	2.55	2.72	3.09	3.36
	T_2	0.98	1.43	1.98	2.30
	T_3	0.17	0.18	0.19	0.20
Bt Begun -3	T_0	3.38	3.73	4.27	5.98
	T_1	3.07	3.68	3.94	4.26
	T_2	1.55	1.97	2.19	2.46
	T_3	0.59	0.79	0.90	1.02

Variety	Salinity Level	Root length (cm) at different days after sowing(DAS)			
		6	8	10	12
Bt Begun -4	T_0	2.00	2.48	2.78	3.06
	T_1	1.31	1.43	1.54	1.68
	T_2	0.30	0.56	0.79	1.38
	T_3	0.00	0.00	0.00	0.00
LSD at 5%		0.76	1.01	0.82	0.98
LSD at 1%		1.09	1.45	1.17	1.41
Level of sig.		**	**	**	**

T_0 =Control, T_1 =50 mM, T_2=100 mM, T_3=150 mM
** indicates significant at 0.01 probability, * indicates significant at 0.05 probability

Effect of salinity on seed vigor index

There was significant variation in vigor index due to salinity levels (Table 5). Considering the salinity levels, at 12 DAS, the highest seed vigor index (656.60) was observed in control followed by 50 mM NaCl (401.90), while the lowest (14.01) was recorded in 150 mM Nacl salinity. Significant difference in seedling vigor among the nine varieties of brinjal was summarized in Table 5. At 12 DAS, the highest seed vigor index (586.00) was recorded in Bt Begun-3 and lowest (130.10) was found in BARI Begun-10. The combined effect of salinity stress to varieties on the seedling vigor was also significant (Table 6).

Table 4. Main effect of salinity and variety on number of seedlings having primary leaves at 12 days after sowing.

Salinity Level	No. of seedlings having primary leaves out of 20 seedlings
Control	14.15
50 mM	9.15
100 mM	1.78
150 mM	0.00
LSD at 5%	2.89
LSD at 1%	5.35
Level of significance	**
Variety	No. of seedlings having primary leaves out of 20 seedlings
BARI-1	7.25
BARI-4	4.17
BARI-5	4.67
BARI-6	3.33
BARI-10	3.17
Bt-1	4.67
Bt-2	10.58
Bt-3	12.00
Bt-4	6.58
LSD at 5%	5.24
LSD at 1%	8.14
Level of significance	*

T_0 =Control, T_1 =50 mM, T_2=100 mM, T_3 =150 mM
* indicates significant at 0.05 probability

Table 5. Main effect of salinity and variety on seed vigor index.

Salinity Level	Seed vigor index
Control	656.60
50 mM	401.90
100 mM	131.30
150 mM	14.01
LSD at 5%	11.35
LSD at 1%	20.99
Level of significance	**
Variety	Seed vigor index
BARI-1	299.40
BARI-4	147.70
BARI-5	391.00
BARI-6	208.60
BARI-10	130.10
Bt-1	247.80
Bt-2	402.10
Bt-3	586.00
Bt-4	294.90
LSD at 5%	8.548
LSD at 1%	13.15
Level of significance	**

** indicates significant at 0.01 probability

Table 5. Combined effect of salinity and variety on the number of seedlings having primary leaves at 12 days after sowing.

Variety	Salinity Level	No. of seedlings having primary leaves out of 20 seedlings	Vigor index (%)
BARI Begun -1	Control	16.33	662.00
	50 mM	12.67	440.50
	100 mM	0.00	89.10
	150 mM	0.00	5.77
BARI Begun -4	Control	10.67	303.20
	50 mM	6.00	233.40
	100 mM	0.00	47.80
	150 mM	0.00	6.56
BARI Begun -5	Control	12.33	898.00
	50 mM	6.33	620.10
	100 mM	0.00	40.20
	150 mM	0.00	7.92
BARI Begun -6	Control	13.33	624.90

Variety	Salinity Level	No. of seedlings having primary leaves out of 20 seedlings	Vigor index (%)
	50 mM	0.00	182.80
	100 mM	0.00	26.80
	150 mM	0.00	0.00
BARI Begun -10	Control	7.67	374.70
	50 mM	5.00	140.60
	100 mM	0.00	5.00
	150 mM	0.00	0.00
Bt Begun -1	Control	13.00	653.90
	50 mM	5.67	323.80
	100 mM	0.00	13.62
	150 mM	0.00	0.00
Bt Begun -2	Control	18.33	648.90
	50 mM	18.00	622.30
	100 mM	6.00	330.00
	150 mM	0.00	7.22
Bt Begun -3	Control	20.00	1102.20
	50 mM	18.40	673.44
	100 mM	10.00	471.72
	150 mM	0.00	98.60
Bt Begun -4	Control	16.00	641.90
	50 mM	10.33	380.61
	100 mM	0.00	157.20
	150 mM	0.00	0.00
LSD at 5%		2.47	13.17
LSD at 1%		3.55	18.83
Level of significance		**	**

** indicates significant at 0.01 probability

Conclusion

Seed germination, root and shoot length, number of seedlings having primary leaves and seed vigor index gradually decreased at salinity levels 100 mM and 150 mM as compared to control and 50 mM NaCl. Seedling growth characteristics of the brinjal cultivars tested were also influenced by the levels of salinity. The Bt Begun-3 was found to be the best variety for the level of control, 50 mM, 100 mM, 150 mM salinity, and was closely followed by the cultivars BARI Begun-1, BARI Begun-4, BARI Begun-5, Bt Begun-2 and Bt Begun-4.

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